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A CONTRIBUTION TOWARD THE KNOWLEDGE OF NEW YORK THYSANOPTERA, WITH DESCRIP-TIONS OF NEW GENERA AND SPECIES

II

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The first paper of this series on the Thysanoptera of New York was published in 1925, in the Bulletin of the Brooklyn Entomological Society, Vol. 20, pp. 124–130. The present article, the second of the series, has for its purpose the bringing forward of several new species and the recording of some observations on the synonymy and distribution of New York forms, as a necessary step preliminary to the publication of the state list of insects.

Six species originally described from Europe are for the first time recorded from America in this paper, but only after the most painstaking comparison, by means of companion microscopes, with thoroughly authentic material secured for the purpose from the leading specialists in Europe—Priesner, Bagnall, Karny, O. M. Reuter, Schille, Buffa, Uzel, John, and others.

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Some of the species discussed have been mentioned repeatedly in the literature, and I have found it necessary in several cases to confine the citations to a few of the more important papers only.

The types of the new species are in the author's collection.

Æolothrips nasturtii Jones

1912. *Æolothrips nasturtii* Jones, Tech. Ser. No. 23, Pt. I, Bur. Ent., U. S. Dept. Agr., p. 2, Pl. I, figs. 1–4. [1 \, \cap \), San Jose, California, on *Nasturtium officinale*.]

1913. F. [ranklinothrips] nasturtii Bagnall, Trans. 2d Ent. Congr., p. 397.

1915. Æolothrips nasturtii Hood, Ent. News, Vol. XXVI, p. 162.

Improbable though it may seem, no differences are to be found between the holotype of this species, described from California, and two specimens taken by the writer at Ithaca, New York, May 13, 1926. It was not uncommon among the grass growing about the trees in an orchard close to the Cornell campus, and many more specimens could easily have been taken—and would have been—had I not mistaken it for $\cancel{Eolothrips}$ fasciatus at the time.

The absence of cross veins in the wings has been stressed as the chief means for recognizing this species, and, to be sure, these veins are not readily seen; but they are undoubtedly present, and in the usual positions. For the recognition of the species, far better characters are to be found in the long head, slender wings, and the proportionate lengths of the antennal segments. In antennal structure the species suggests \mathcal{E} . bicolor Hinds, in that the last four segments are not subequal. The following table shows the constancy of this character in three females, the measurements being in microns and pertaining to segments 3 to 9:

3	4	5	6	7	8	9
San Jose, California (holotype) 130	104	68	36	20	16	12
Ithaca, New York 137	108	69	40	22	14	12
((((100	68	36	20	16	12

The following material is before me:

Colorado: Boulder, June 14, 1924, flowers of Iris missouriensis, L. O. Jackson; 1 $\,\circ\,$.

Denver, June 21, 1918, in sweepings, L. O. Jackson; $4 \ \circ$.

Golden (South Table Mt.), June 20, 1918, L. O. Jackson; 9 9.

ILLINOIS: Muncie, July 18, 1908, and May 16, 1909, in

sweepings, C. A. Hart; 3 ♀.

New York: Ithaca, May 13, 1926, in sweepings from grass, J. D. Hood; 2 \, \text{\rightarrow}.

Sericothrips cingulatus Hinds

1902. Sericothrips cingulatus Hinds, Proc. U. S. Nat. Mus., Vol. XXVI, p. 141, Pl. III, figs. 27–29. [\$\varphi\$, \$\delta\$, \$\delta\$, Amherst, Mass., on various grasses.]

1911. Sericothrips cingulatus Moulton, Tech. Ser. No. 21, Bur. Ent., U. S. Dept. Agr., pp. 14, 24. [Nebraska

City, Neb., on grass.

1913. Sericothrips cingulatus Morgan, Proc. U. S. Nat. Mus., Vol. 46, p. 45. [Clarksville, Tenn., on broom sedge and plantain.]

1917. Sericothrips cingulatus Hood, Ins. Insc. Menstr., Vol. V, p. 58. [Maryland and Illinois, on grass.]

Professor Glenn W. Herrick has submitted to me for determination specimens of this species which were taken by Mr. H. J. Pack, in May, from the stomach of a very young trout reared in the Fish Hatchery at Cornell University, Ithaca, New York. Though a common grass species of wide distribution, this is its first known occurrence in New York.

Sericothrips annulipes sp. nov. (Pl. XX, Fig. 4.)

Female (macropterous).—Length about 1.0 mm. Color straw-yellow, with numerous brown markings, pterothorax and last two or three abdominal segments more intensely yellow, prothorax more nearly colorless; head darkened with brown except for a yellow ring around eyes; ocellar pigment red; prothoracic brown blotch broken up into two longitudinal series of three or four small spots; pterothorax brown in anterior half, metascutum darker than mesoscutum, the latter pale posteriorly; abdomen with a narrow, transverse, dark brown line at base of tergites 2–7, behind which is a more or less obscure brown band, broadest at sides; tergites 7 and 8 almost entirely brown, paler and yellowish along posterior margin only; antennæ with segments 1–4 nearly colorless, excepting extreme tip of 3 and apical third of 4, which are gray-brown; 5–8 dark gray-brown with basal half

of 5 paler; legs concolorous with body, all femora apically and all tibiæ at middle with a distinct brown annulus; fore wings with scale dark brown or gray and with a median dash of brown at extreme base, the remainder of basal fifth, the third fifth, and the apical fifth, white or nearly so, intervening fifths dark gray or brown; hind wings nearly white, with a dark median streak which is absent from base and extreme apex.

Head broad, nearly twice as wide as length in front of occipital line, broadest across eyes, ocellar area and vertex with faint lines of sculpture, bristles as usual in the genus. Eyes prominent, protruding, pilose, about 0.7 as wide as their interval, which is about equal to their length. Antennæ about 3.3 times as long as head in front of occipital line, segments formed as usual in the group, sixth not pedicellate.

Mouth cone hardly attaining base of prosternum.

Prothorax with the pronotum about 1.6 times as long as head in front of occipital line and 1.5 times as wide as long, of the usual form; pronotum with the usual raised, anastomosing, transverse lines, which are closely spaced in the area of the pronotal blotch and distant, tending toward reticulation, elsewhere; bristle at posterior angles long and pale. Fore wings about 19 times as long as width at middle, which is about 0.54 the width just beyond base; costal margin with about 29 bristles, longitudinal vein with a basal group of 3 followed by about 20, the distal one of these in the white apical area and widely separated from the others; two additional bristles near tip of wing, in a series posterior to longitudinal vein. Legs not markedly long and slender.

Abdomen normal, the pubescence largely dark and distinct, absent from median portion of basal tergites; bristles

slender, vellowish, inconspicuous.

Measurements of holotype (\mathfrak{P}): Length 1.05 mm.; head, length to occipital line 0.084 mm., greatest width (across eyes) 0.162 mm., least width (at base) 0.140 mm.; eyes, length 0.067 mm., width 0.048 mm., interval 0.066 mm.; prothorax, median length of pronotum 0.136 mm., width 0.204 mm.; pterothorax, width 0.278 mm.; fore wings, length 0.780 mm., width at middle 0.040 mm., near base 0.074 mm.; abdomen, greatest width 0.300 mm.

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Male (macropterous).—Length about 0.8 mm. Color of body and appendages as in female and pronotum similarly sculptured.

Described from four females and one male, as listed:

New York: Ithaca, August, 1926, on unidentified legume, L. O. Jackson: $2 \circ (holotype)$ and paratupe).

VIRGINIA: Falls Church, June 16, 1918, E. A. Chapin; 2 ♀ (paratupes).

Four Mile Run, April 25, 1915, on cherry foliage, L. O. Jackson; 1 & (allotype).

No difficulty should be had in recognizing this species. The two dark wing bands, the dark seventh and eighth abdominal segments, the broken pronotal blotch, the annulate femora and tibiæ, and, especially, the sculpture of the pronotum, make it very distinct. It is related to variabilis (Beach).

Echinothrips subflavus sp. nov. (Pl. XX, Fig. 3.)

Female (macropterous).—Length about 1.3 mm. Color yellow, with antennal segments 1 and 2, apices of 3-5, distal two-thirds of 6, and all of 7 and 8 brown; or (presumably in older individuals) with the following additional brown markings: posterior half of occiput, all of prothorax, margins of pterothorax, a narrow transverse bar on metathorax, an irregular bar across each of abdominal tergites 3-6, all of abdominal sternites 2-6; wings pale at base, shading to brownish gray apically; ocellar pigment bright scarlet red.

Head shorter than its width across eyes, longer than width near base; cheeks straight, parallel; frontal costa broadly emarginate; surface subreticulate with anastomosing lines; postocular and interocellar bristles subequal, longer than diameter of ocelli. Eyes strongly protruding, about as long as their interval and about as wide as their distance from posterior margin of head. Ocelli nearly equidistant, opposite middle of eyes. Antennæ just twice as long as head, of normal structure for the genus; trichomes on segments 3 and 4 simple.

Prothorax about 0.7 as long as head and somewhat more than half as long as wide: notum with the usual subreticulate pattern of anastomosing lines; posterior angles with the two usual bristles pale, hardly pointed, and half as long as notum. Wings long and slender; costa with about 22 pointed bristles,

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those at middle of wing twice its width; longitudinal vein with about 16 similar but shorter bristles.

Abdomen typical of the genus; tergites finely pubescent in lateral fourth and with lines of sculpture that curve posteriorly along sides; bristles on apical segments short,

pointed, yellow.

Measurements of holotype (\$): Length 1.26 mm.; head, length 0.165 mm., greatest width (across eyes) 0.173 mm., least width (at base) 0.156 mm.; eyes, length 0.080 mm., width 0.050 mm., interval 0.074 mm.; postocular bristles, length 0.032 mm.; prothorax, length 0.117 mm., width 0.210 mm.; pterothorax, width 0.300 mm.; abdomen, greatest width 0.308 mm.; fore wings, length 1.14 mm., width at middle about 0.052 mm., width just beyond scale 0.076 mm.

Measurements of paratype from Quicksand, Kentucky (\circ): Head, length 0.166 mm., greatest width (across eyes) 0.172 mm., least width (at base) 0.156 mm.; eyes, length 0.084 mm., width 0.050 mm., interval 0.072 mm.; postocular bristles, length 0.032 mm.; prothorax, length 0.116 mm., width 0.212 mm.

Described from three females. The holotype was taken at Little Valley, New York, Sep. 17, 1925, under bark of beech sapling, by P. J. Chapman. The paratypes are from Nigger Pond (Oswego Co.), N. Y., Sep. 3, 1926, from larch, P. J. Chapman; and from Quicksand, Kentucky, June 25, 1925 (no data on habitat), C. R. Crosby and P. J. Chapman.

The pale color and the pointed wing bristles distinguish the species at a glance—in fact, the latter character deprives the genus itself of what has heretofore been its most important differentia. The dark colored New York specimens, taken in the autumn under bark, are probably old, mature individuals which were seeking places for hibernation; while the paler Kentucky specimen, taken in June, had quite possibly emerged only recently. I am positive that they represent the same species.

Tæniothrips salicis (Reuter).

1879. Thrips salicis Reuter, Öfv. Vet. Soc. Förh., Vol. XXI, p. 200. [Finland.]

1926. Taniothrips salicis Priesner, Thys. Eur., p. 309; Taf. IV, Abb. 67 and 68. [Throughout Europe.]

Many years ago John J. Davis, Charles A. Hart, and I took this species in Illinois, but I have hesitated to record it from North America until actual comparison had been made with authentic European material. Such material has now come to hand in the form of a topotypic specimen from Reuter's own collection and labeled in his own hand, as well as twelve Austrian specimens from Dr. Priesner. The series before me is thoroughly homogeneous, even to the most minute details of color and structure. The American material is listed below:

Illinois: Aurora, July 8, 1908, on willow leaves, J. J. Davis: 3 \, 2.

Muncie, Aug. 21, 1908, on Salix discolor, C. A. Hart; 3 ♀.

Riverside, July 14, 1909, on Salix and Cratægus, J. D. Hood; 2 , 1 &.

New York: Slaterville, May, 1926, on Salix sp., J. D. Hood; 1 \circ .

Thrips nigropilosus Uzel.

1895. Thrips nigropilosus Uzel, Mon. Ordn. Thys., p. 198, Tab. VI, fig. 105, 106. [\$\mathbb{Q}\$, \$\mathcal{E}\$ behavior, Bohemia, in turf, etc.]

1896. Thrips lactucæ Beach, Proc. Iowa Acad. Sci., Vol. III, p. 224. [φ , Ames, Iowa, on wild lettuce (Lactuca).]

1914. Thrips lactucæ Hood, Proc. Ent. Soc. Wash., Vol. XVI, p. 43. [Merely notes that the species was overlooked by Moulton.]

This species was overlooked by both Hinds¹ and Moulton.² I have seen Miss Beach's types of *lactucæ* and have compared them with well authenticated European material of *nigropilosus*. There are no differences. In greenhouses this thrips is frequently a source of much trouble because of its depredations upon chrysanthemums—

¹ Proc. U. S. Nat. Mus., Vol. XXVI, pp. 79–242; 1902.

² Bur. Ent., U. S. Dept. Agr., Tech. Ser., No. 21, pp. 1–56; 1911.

in fact, my own personal experience would indicate that it is our commonest greenhouse thrips. From *T. tabaci*, which, also, is a greenhouse species of no slight importance, it may be distinguished under a good hand lens by the bright red ocellar crescents (in *tabaci* these are yellow), the nearly black antennæ, and the almost invariable presence of short-winged forms.

In the very earliest spring days, while patches of snow were still lingering on the ground, I have found short-winged individuals out-of-doors, at the base of the leaves of *Verbascum thapsus*, the common mullein, many miles from any greenhouse. If the species has been introduced into America from Europe, it is firmly established. Unfortunately I have not saved samples of all the material (particularly from New York State) which has passed through my hands, or the following list of slides of American specimens now before me would be much more extended:

Illinois: Urbana, Nov. 3, 1907, in University greenhouse, R. D. Glasgow; 1 ♀.

Urbana, May 8, 1909, in Insectary greenhouse, C. E. Sanborn: 1 9.

Iowa: Ames, Oct. 20 and Nov. 16, 1893, and Mar. 21, 1894, on leaves of *Lactuca*, Alice M.

Beach; $18 \circ (types \text{ of } T. lactucæ$ Beach).

Ames, Dec. 14, 1926, on chrysanthemum in greenhouse, S. C. Jones; 2 ♀.

SOUTH DAKOTA: Brookings, Jan. and Feb., 1925, on chrysanthemum in greenhouse, Geo. Gilbert-

son; 7 ♀, 3 ♂.

New York: Berkshire, June 23, 1925, on lettuce, N. H. Eason; $2 \circ$.

Canastota, Aug. 5, 1912, on castor oil plant in greenhouse, J. C. Faure; 6 ♀.

Ithaca, Jan. 25, 1913, on chrysanthemum in greenhouse, J. C. Faure; 4 ♀.

Macedon, Apr. 13, 1924, on Verbascum thapsus (out-of-doors), J. D. Hood;

Rochester, Mar. 31, 1924, on lemon verbena in greenhouse, J. D. Hood; 1 \, \tau.

Rochester, Jan. 14, 1927, on chrysanthemum in greenhouse, E. A. Maynard; 4 9.

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Thrips monotropæ sp. nov. (Pl. XX, fig. 1; pl. XXI, fig. 1.)

Female (macropterous).—Length about 1.2 mm. General color blackish brown, pterothorax with orange-colored subhypodermal pigmentation, last two abdominal segments yellowish; antennæ blackish brown, concolorous with body, segments 1 and 2 inclined to be brownish rather than blackish, pedicels only of segments 3 and 4 paler; legs yellowish brown, slightly paler than body; wings brown, distinctly but not abruptly paler in basal third or fourth; ocellar pigment brick-red.

Head about 1.17 times as wide as median dorsal length, about equal in length to pronotum, broadest midway between eves and base, and with about five moderately distinct anastomosing lines on occiput; cheeks rather strongly arched; vertex flattened, not forming an overhanging angulation above antennæ but sloping evenly to frontal costa, this last very shallowly and roundly notched at about 90°; interocellar and postocellar bristles short, subequal, somewhat longer than postoculars; ventral surface of head with the two pairs of long bristles near bases of antenna, the inner pair reaching beyond base of second segment. Eves about 0.55 as long as head and about 0.8 as wide as their interval, decidedly prominent and somewhat protruding, pilose as usual. Ocelli normal, about opposite middle of eyes. Antennæ moderately stout, about 2.26 as long as head, of normal structure; segment 3 stout, about twice as long as wide. Maxillary palpi three-segmented, as usual.

Prothorax about 1.7 times as wide as median dorsal length, without distinct lines of sculpture except near posterior margin, sides gently rounded; bristles at posterior angles subequal, long and slender, brown, about 0.8 the length of pronotum; a pair of bristles on posterior margin near middle and another at posterior third near lateral margins, distinctly longer and heavier than postocellars; pronotum with about twenty pairs of shorter bristles, most of them hardly equal to postocellars, excepting one pair near anterior margin and another near anterior angles. Wings of fore pair with about 23 rather long, dark brown bristles (some nearly black) on costal margin; anterior vein with an evenly spaced basal group of 8 (rarely 7 or even 6), followed by one just beyond middle, one at distal fifth, and another nearly at tip; posterior vein with about 12 similar bristles, the first of which is usually about opposite the penultimate one in the basal series of the anterior vein, and the last of which is nearly opposite a point midway between the last two bristles on the anterior vein.

Abdomen of normal form; tergite 8 with a complete comb of somewhat irregularly spaced minute spines on posterior margin; tenth segment divided above nearly to base; bristles on segments 9 and 10 long, slender, brown, hardly as long as the combined lengths of these segments; sternites with the usual three pairs of long bristles on extreme posterior mar-

gin, but without accessory bristles.

Measurements of holotype (\circ): Length 1.23 mm.; head, length 0.128 mm., width at middle 0.150 mm., behind eves 0.140 mm., at base 0.140 mm.; eves, length 0.070 mm., width 0.046 mm., interval 0.058 mm.; prothorax, length of pronotum 0.125 mm., width 0.212 mm.; pterothorax, width 0.270 mm.; fore wings, length 0.740 mm., width at middle 0.056 mm., near base 0.084 mm.; abdomen, width 0.315 mm.

> 2 Antennal segments: 1 3 4 Length (µ) 30 40 52 51 39 58 20 Total length of antenna 0.29 mm.

Described from three females taken by the writer at Sodus Point, New York, in a flower of Monotropa uniflora, August 10, 1924.

The dark color of the entire body, with the orange pterothoracic pigmentation and the stout, nearly black antennæ are distinctive.

(Pl. XX, Fig. 2.) Thrips veratri sp. nov.

> Female (macropterous).—Length about 1.5 mm. General color brown (abdomen darkest), with head, legs (particularly the tarsi and apices of tibiæ), segment 3 of antenna, and pedicels of 4 and 5 paler; head darkest in ocellar area;

wings nearly uniform brownish.

Head about 1.27 times as wide as median dorsal length, about 0.9 as long as pronotum, broadest midway between eyes and base, and with six or seven distinct anastomosing lines on occiput; cheeks distinctly arched; vertex flattened, evenly declivous, obtusely but decidedly angulate in front of eyes above antennæ, transversely roughened; frontal costa roundly and deeply notched at about 90°; interocellar, postocellar, and postocular bristles short, subequal; ventral surface of head with two pairs of long bristles near bases of antennæ, the inner pair reaching nearly to middle of second antennal segment. Eyes about one-half as long as head and two-thirds as wide as their interval, moderately prominent

and protruding, pilose as usual. Ocelli normal, about opposite middle of eyes. Antennæ slender, about 2.4 times as long as head, of normal structure; segment 3 slender, nearly three times as long as wide. Maxillary palpi three-seg-

mented, as usual.

Prothorax about 1.83 times as wide as median dorsal length, with distinct (but not prominent) anastomosing lines of sculpture, sides gently rounded; bristles at posterior angles subequal, long and slender, brown, about 0.8 the length of pronotum; four additional pairs of bristles, longer and stouter than postocellars, on anterior margin, at anterior angles, at posterior third of lateral margins, and near middle of posterior margin, respectively; pronotum with about twenty pairs of shorter bristles, about equal to postocellars. Wings of fore pair with about 21 rather long, brown bristles on costal margin; anterior vein with a basal group of 7, followed by one just beyond middle, one at distal fifth, and another nearly at tip; posterior vein with about 11 similar bristles, the first of which is usually opposite a point midway between the last two bristles in the basal series of the anterior vein, and the last of which is opposite a point nearly midway between the last two on the anterior vein.

Abdomen of normal form; segment 8 with complete comb of evenly-spaced spines on posterior margin; tenth segment divided above nearly to extreme base; bristles on segments 9 and 10 long, slender, brown, and about as long as the combined lengths of these segments; sternites with the usual three pairs of long bristles on extreme posterior margin, but

without accessory bristles.

Measurements (principally of holotype): Length 1.49 mm.; head, length 0.134 mm.; width at middle 0.170 mm.; just behind eyes 0.156 mm.; at base 0.164 mm.; eyes, length 0.068 mm., width 0.048 mm., interval 0.072 mm.; pronotum, length 0.140 mm.; width of prothorax 0.256 mm.; pterothorax, width 0.336 mm.; abdomen, width 0.352 mm.

Antennal segments:	1	2	3	4	5	6	7	
Length (µ)	30	48	62	54	47	60	23	
Width (µ)	36	28	22	20	20	20	8	
Total length of antenna 0.32 mm.								

Described from several specimens taken at Ithaca, New York, on *Veratrum viride*, by Glenn W. Herrick (June 27, 1924) and by the writer (July, 1926).

The large size, dark color, and long pronotal bristles distinguish this species from all others known to occur in Eastern North America. The figure illustrating this species defines it more satisfactorily, however, than any description could.

Thrips fuscipennis Haliday.

1852. Thrips fuscipennis Haliday, Walker, List Hom. Ins. Brit. Mus., Pt. IV, p. 1111. [\$\opi\$, Britain.]

To this species, which is likewise an addition to the North American fauna, I refer without hesitation one female taken by Mr. L. O. Jackson at Ithaca, New York, in a flower of *Angelica atropurpurea*, in July, 1926. More than seventy slides of European material are before me, from England, Austria, Hungary, and Italy.

Thrips flavus Schrank.

1776. Thrips flava Schrank, Beyträge zur Naturgesch., p. 31, Tab. I, figs. 25 and 26.

This, another interesting addition to the North American fauna. Three females, taken by L. O. Jackson at Ithaca, New York, in July, 1926, in flowers of *Angelica atropurpurea*, are con-specific with a series of seven specimens bearing this name sent to me by Dr. Karny, from Bohemia.

Thrips calcaratus Uzel.

1895. Thrips calcarata Uzel, Mon. Ordn. Thys., p. 195, Tab. VI, fig. 104. [♀, Bohemia, in flowers, May.]

1914. Bagnallia calcarata Karny, Verh. k. k. zool.-bot. Ges. Wien, Bd. LXIV, p. 56. [Vallombroso, Italy, leaves of Tilia.]

1916. Thrips (Bagnallia) calcarata Williams, The Ent., Vol. XLIX, p. 282. [England, on opening leaves of Tilia, May 10.]

This species, structurally one of the most distinct and interesting in its genus, has not previously been reported from North America; but at the Lloyd-Cornell Reservation, near McLean, N. Y., it is in May the commonest thrips to be found. Dr. M. D. Leonard and I took hundreds of specimens on May 19, 1925, and observed it on nearly every plant on which we looked. It was abundant on grass and the leaves of various trees, and in the flowers of Sambucus. Two of Dr. Karny's specimens from Vallombroso, Italy (cited above), are available for comparison.

Baliothrips dispar (Haliday).

1836. Thr. [ips] dispar Haliday, Ent. Mag., Vol. III, p. 449. [♀, ♂, Britain, on grasses in autumn.]

1836. Thr. [ips] brevicornis Haliday, Ent. Mag., Vol. III, p. 449. [2, Britain, on Festuca fluitans.]

1909. Baliothrips basalis Shull, Ent. News, Vol. XX, p. 224, fig. 5. [9, 3, Huron Co., Michigan, on grass, August.]

1911. Bagnallia agnessæ Bagnall, Journ. Econ. Biol., Vol. VI. pp. 7, 10. [2. England, grass. October.]

VI, pp. 7, 10. [\$\gamma\$, England, grass, October.]

1911. Bagnallia halidayi Bagnall, Journ. Econ. Biol., Vol. VI, pp. 8, 10. [\$\delta\$, England, grass, September.]

Two cotypes (one male and one female) of Shull's *B. basalis* do not differ from a series which I have before me of 24 European specimens of *B. dispar* (Haliday). In America the species has been known only from Shull's types taken in Michigan, and it is therefore of interest to record the capture by Jacobus C. Faure, now Professor of Entomology in the Transvaal University College, of four females at Chester, New York, April 3, 1913, on grass.

Merothrips morgani Hood.

1912. Merothrips morgani Hood, Proc. Ent. Soc. Wash., Vol. XIV, p. 132, Pl. V, figs. 1–3. [\(\rightarrow \), \(\frac{1}{3} \), Illinois and Kentucky, under bark and in mushroom.]

1914. Merothrips morgani Hood, Ins. Insc. Menstr., Vol. II, p. 17. [Maryland and District of Columbia, under bark and in bird's nest.]

1917. Merothrips morgani Hood, Ins. Insc. Menstr., Vol. V, p. 60. [Florida and Maryland, under bark and in débris.]

It is not unlikely that this represents the only really new type of recent Thysanopterous insect described since the time of De Geer. This minute, rare, and singular insect is the type of its genus and family, and it is of interest to record the taking of one female at Macedon, New York, under the bark of a fallen elm tree, October 26, 1924, by the writer.

Cryptothrips (?) breviventris sp. nov. (Pl. XXI, fig. 6.)

Male (brachypterous).—Length about 1.3 mm. Color³ nearly black, with tarsi, apices of fore tibiæ, antennal segment 3, basal two-fifths of 4, and basal third of 5, yellowish. Head very slightly longer than wide, rounded, broadest at middle, cheeks curving to eyes and converging toward a

³ The meager color description is due to the fact that the specimen was cleared in KOH and the color largely destroyed before the species was recognized as new.

slight neck-like constriction; vertex truncate, not at all produced, the anterior ocellus flush with anterior margin of eyes; dorsal and lateral surfaces with a few very faint anastomosing lines and several small bristles, of which a pointed occipital pair, midway between postoculars and base of head, are decidedly longest and only slightly shorter than anterior marginals; postocular bristles long and pointed, 0.45 as long as head. Eyes not at all protruding, short, only 0.28 as long as head and almost as wide as long, interval 1.32 times their width. Posterior ocelli with their hind margins opposite center of eyes. Antennæ two and one-third times as long as head; segment 3 clavate, sides almost exactly straight; 4-6 pedicellate; 7 narrowed at base, not pedicellate; 8 subconical, twice as long as greatest width, narrowed slightly in basal third, broadly united to 7; sense-cone formula: 3, 1-2; 4, 2-2; 5, $1-1^{+1}$; 6, $1-1^{+1}$; 7 with the usual one on dorsum near apex. Mouth cone broadly rounded; labrum pointed, surpassing labium and attaining posterior margin of prosternum.

Prothorax nearly three times as broad across coxæ as median length of pronotum, which is about 0.54 as long as head; epimeron almost completely fused with pronotum; pronotum smooth; all bristles present, pointed; midlaterals longest, the two pairs at posterior angles subequal and a little shorter, twice as long as those at anterior angles, which are twice as long as anterior marginals, these last slightly longer than an approximate pair near posterior margin. Legs noticeably slender, particularly the fore femora; fore tarsi with a minute triangular tooth at apex of first segment.

Abdomen short, broadest at segment 2, the seven proximal segments short and decidedly transverse, the tergite of 3 nearly six times as wide as long; length of abdominal tergites in microns: 2, 65; 3, 68; 4, 64; 5, 62; 6, 72; 7, 78; 8, 92; 9, 100; 10, 165; sternite 8 with an irregular transverse area occupying the middle third of its entire width, this band apparently partially membranous and sensory, with a stippled appearance. Tube 0.8 as long as head, about 2.2 times as long as basal width, which is 1.7 times the apical, distinctly narrowed at basal third and at apex; lateral bristles long, pointed; terminal bristles equal in length to tube, brown.

Measurements of holotype (3): Length 1.28 mm.; head, length 0.206 mm., greatest width 0.197 mm., width near base 0.185 mm.; eyes, length 0.058 mm., width 0.056 mm., interval 0.074 mm.; postocular bristles, length 0.092 mm.; prothorax, median length of pronotum 0.111 mm., width across coxæ 0.324 mm.; pterothorax, width 0.345 mm.; abdomen, width 0.387 mm.; tube, length 0.165 mm., width near base 0.074

mm., at apex 0.043 mm.

Described from one male taken by the author at Macedon, New York, October 26, 1924, in moss on a fallen tree in a lowland (muck) woods. The most careful search possible, on many subsequent occasions, of the same tree and others like it, has failed to disclose further specimens.

The broadly-rounded mouth cone, slender legs, transverse abdominal segments, the form of the tube (narrowed at tip and at basal third), the antennal structure, the union of the proepimeron with the pronotum, the chætotaxy,—all indicate affinities with Cryptothrips, in which I have for the present, at least, placed it. It is hoped that the discovery of more material will soon follow, and that the species may then be given a positive generic assignment. It has no close North American relatives, within my knowledge, with which it may profitably be compared.

Cryptothrips rectangularis Hood.

1908. Cryptothrips rectangularis Hood, Can. Ent., Vol. XL, p. 307, fig. 18. [2 ♀, 2 ♂, Urbana, Ill., and Harrisburg, Pa., under bark and in burrows, willow and peach trees.]

1913. Cryptothrips rectangularis Morgan, Proc. U. S. Nat. Mus., Vol. 46, p. 45. [Bridgeville, Del., under peach bark.]

1921. Trichothrips salicis Watson, Bull. Brooklyn Ent. Soc., Vol. XVI, p. 80. [1 &, Cranberry Lake, N. Y., on willow.]

1923. Gastrothrips salicis Watson, Bull. 168, Fla. Agr. Exp. Sta., p. 67.

This is a true *Cryptothrips*, so closely related, indeed, to the genotype *C. latus* Uzel as to cause one to hesitate between considering it a valid species (as I have done) or reducing it to subspecific rank.

Through the kindness of Mr. George P. Engelhardt, Curator of the Brooklyn Museum of Arts and Sciences, I have been able to study the unique type of Watson's *Trichothrips salicis*, taken at Cranberry Lake, N. Y., July 14, 1919, on willow, by C. J. Drake. In all respects it is identical with my *Cryptothrips rectangularis*

described fifteen years previously, in part from specimens taken on the same plant, willow.

The insect is common and widely distributed, as the following records of material now before me will show:

ILLINOIS: Urbana, May 12, 1908, under dead bark on peach tree, J. D. Hood, 1 \, \varphi\ \ (holotype),

13 (allotype).

Urbana, March 31-April 2, 1908, reared from nymph taken on willow, J. J. Davis; 1 & (paratype).

Bosky Dell, Oct. 22, 1908, on white oak branch, L. M. Smith: 1 &.

Carbondale, Sep. 21 and 22, 1908, on *Ulmus* and peach branches, L. M. Smith; $5 \circ$, $3 \circ$

Chicago, Nov. 11, 1910, in Sesiid burrows in lilac, J. J. Davis; 1 ♀.

Muncie, July 24, 1909, on dead willow branch, J. D. Hood and C. A. Hart; 1 &.

Riverside, July 17, 1909, under willow bark, J. D. Hood; 2 \, \(\psi \).

WISCONSIN: Madison, April 20, 1912, under bark of elm,

J. W. Brann; 19, 2 nymphs.

Texas: Dallas, May 30, on Bermuda grass, W. A Hooker; 1 \, \tau.

VIRGINIA: Vienna, May 25, 1913, sweeping at base of plum tree, R. A. Cushman; $1 \circ$.

Dist. of Columbia: Washington, May 22, 1913, running about on maple tree, J. D. Hood; 1?.

Pennsylvania: Harrisburg, March 10, in burrows in willow twig, Pa. State Dept. Agr., Div. Zool.,

No. 5251h; 1♀ (paratype).

Massachusetts: Forest Hills, Aug. 11, 1915, in galls on willow, L. T. Williams; 2 \, \tau.

NEW YORK:

Macedon, May 4, 11, 18, 21, 27, 30, and June 7, 1924, under willow bark, J. D. Hood; 32 \, 27, 27 \, 5, 5 nymphs, 4 prepupe, 8 pupe.

Kenwood, July 20, 1912, on peach bark. J. C. Faure; 1 ♀.

Leptothrips mali (Fitch).

- 1855. Phlæothrips mali Fitch, First Rept. Nox. Ins. State N. Y., p. 102; also in Trans. N. Y. State Agr. Soc., Vol. IV, for 1854, p. 806.
- 1902. Cryptothrips aspersus Hinds, Proc. U. S. Nat. Mus., Vol. XXVI, p. 205, Pl. X, figs. 104–106.
- 1904. Criptothrips (sic!) californicus Daniel, Ent. News, Vol. XV, p. 293.
- 1909. Leptothrips aspersus Hood, Ent. News, Vol. XX, p. 249.
- 1910. Liothrips mcconnelli Crawford, Pomona Coll. Journ. Ent., Vol. II, p. 163, fig. 68, A-G.
- 1913. Leptothrips aspersus macro-ocellatus Watson, Ent. News, Vol. XXIV, p. 148.
- 1914. Leptothrips mali Hood, Proc. Biol. Soc. Wash., Vol. XXVII. p. 162.
- 1921. Cryptothrips adirondacks (sic!) Watson, in part only, Bull. Brooklyn Ent. Soc., Vol. XVI, p. 83.

Three specimens from Mr. Watson's type series of Cryptothrips adirondacks have been studied. One, a male, is in the collection of the Brooklyn Institute of Arts and Sciences, and is labeled "Leptothrips adirondackis [sie!], Type"; it is from Cranberry Lake, New York, and was taken July 1, 1919, on Yellow Birch, by C. J. Drake. Another is a female in the collection of the U. S. National Museum and bears exactly the same data, except that the name is given as "Cryptothrips adirondackis." Both of these specimens are thoroughly typical Leptothrips mali. The third specimen which I have seen from his series of types is in my own collection, and was also taken at Cranberry Lake, N. Y., by Dr. Drake, but on Viburnum alnifolium, June 25, 1919. It is not this species at all, but a typical female of Liothrips citricornis (Hood).

The insect is an exceedingly common one, occurring throughout most of North America, usually on the leaves of various trees and bushes. It is generally solitary in its habits and is said to be predaceous.

Liothrips citricornis (Hood).

- 1908. Phyllothrips citricornis Hood, Can. Ent., Vol. XL, p. 305, fig. 15. [♀, Illinois and Pennsylvania, on hickory and wild grape leaves.]
- 1909. Liothrips citricornis Hood, Ent. News, Vol. XX, p. 249.

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1916. Liothrips flavoantennis Watson, Ent. News, Vol. XXVII, pp. 129, 133, Pl. VI, figs. 7-9. [9, Gainesville, Florida, on grape.]

1921. Cryptothrips adirondacks (sie!) Watson, in part only, Bull. Brooklyn Ent. Soc., Vol. XVI, p. 83. [9, Cranberry Lake, New York, on Viburnum.]

1922. Hoplandrothrips flavoantennis Watson, Fla. Ent., Vol. VI, p. 39. [& Clayton, Georgia.]

As pointed out under Leptothrips mali, Mr. Watson's Cryptothrips adirondacks is a composite species, made up of Leptothrips mali and Liothrips citricornis. His Liothrips flavoantennis, which he later referred to the genus Hoplandrothrips, is known to me through one specimen in the U. S. National Museum, taken at Gainesville, Florida, May 20, 1920, on basswood, and determined by him.

The species is a very common one, and specimens are before me from many localities in Illinois, Texas, Connecticut, New York, Pennsylvania, Maryland, District of Columbia, and Virginia. It is frequently abundant on grape and hickory, on the leaves.

Hoplothrips major (Hood).

- 1914. Trichothrips karnyi major Hood, Proc. Biol. Soc. Wash., Vol. XXVII, p. 153. [\, \varphi\, Pennsylvania.]
- 1915. Hoplothrips karnyi major Hood, The Ent., 1915, p. 105.
- 1921. Trichothrips drakei Watson, Bull. Brooklyn Ent. Soc., Vol. XVI, p. 78. [\(\rightarrow \), Syracuse, New York, in Phylloxera galls on hickory, and under bark of black locust.]

Two of Dr. Watson's paratypes of *Trichothrips drakei* have been studied. One, a macropterous female, is labeled *Phlæothrips drakei*, and was taken at Syracuse, N. Y., in October, 1920, under bark of black locust, by Evelyn Osborn. It is in my collection. The other slide comprises an adult brachypterous (perhaps apterous) female and a nymph, taken at Syracuse, N. Y., September, 1919, in Phylloxera galls on hickory, by C. J. Drake. Although Mr. Watson does not compare *drakei* with *major*, which had been described and figured seven years previously, from material taken in Pennsylvania, it is identical with it in all respects.

I now consider major specifically distinct from Hoplothrips karnyi. It would be interesting to compare both with their European congeners.

Mr. Richard S. Bagnall has sent me specimens of this species taken at Beppis, Japan, April 22, 1915, from fungus on fir.

Phlæothrips⁴ chapmani sp. nov. (Pl. XXI, figs. 4 and 5.)

Female (macropterous).—Length about 2.1 mm. Body not roughened dorsally, nearly shining. General color, by reflected light, dark mahogany red, with a narrow, laterodorsal, snow-white stripe extending from the distal margin of the second abdominal segment to the distal margin of the eighth. General color, by transmitted light, brown, with maroon subhypodermal pigmentation; legs and tube blackish brown, non-pigmented; antenne nearly concolorous with

body, the pedicels of 3-6 only slightly paler.

Head nearly 1.3 times as long as greatest width, sides converging rather abruptly to eyes and more gradually to the slight neck-like constriction at base; cheeks rather closely, but not deeply, transversely striate with anastomosing lines and with about four pairs of short bristles along sides, of which the basal pair is larger and is borne on a minute tubercle; postocular bristles wanting, or indistinguishable from the scattered, minute, pointed bristles on occiput; vertex not at all produced, the anterior ocellus about on a line with front Eyes one-half as long as cheeks, about equal in width to their interval, and with about twelve facets making up the lateral outline. Ocelli equidistant, the posterior pair with their posterior margins slightly in advance of middle of eyes. Antennæ (Pl. XXI, fig. 4) about 1.5 times as long as head; segment 8 sharply conical, broadly united at base to 7; sense-cone formula: 5 3, 1-2; 4, 2-2; 5, $1-1^{+1}$; 6, $1-1^{+1}$; 7 with one on dorsum near apex. Mouth-cone nearly attaining posterior margin of prosternum, sides straight.

Prothorax along median dorsal line about one-half as long as head and (inclusive of coxe) about 2.3 times as wide as

⁴ Haliday used the spelling given here. Uzel modified the name to *Phlæothrips* and this emendation has been accepted by nearly all subsequent workers.

⁵ Since 1908 the author has used a formula to indicate the positions of the antennal sense-cones. In this formula, the number of the antennal segment is followed, first, by the number of sense-cones on its inner surface, and then by the number on its outer surface; rudimentary sense-cones are expressed by an exponent preceded by a plus sign. Thus 5, 1–1⁺¹ means that on the fifth antennal segment there is one fully-developed sense-cone on either side, with an additional, rudimentary one on the outer surface.

long; all usual bristles present, dilated at apex, the outer pair at posterior angles much the longest, twice the length of the pair at anterior angles, three times the length of coxal pair. Pterothorax slightly wider than prothorax; sides nearly straight, roundly converging posteriorly. Wings of equal width throughout, perfectly colorless, fore pair with 6–9 accessory hairs on posterior margin near apex. Legs of normal form; fore femora not swollen, about 0.39 as wide as head; tooth of fore tarsus slender, slightly shorter than width of tarsus, straight or curved.

Abdomen of normal form. Tube about 0.64 as long as head, 1.7 times as wide near base as at apex, somewhat narrowed at basal two-fifths; terminal bristles about 0.8 as long as tube. Marginal abdominal bristles colorless, capitate.

Measurements of holotype (\$): Length 2.09 mm.; head, length 0.326 mm., greatest width 0.255 mm., least width 0.230 mm.; eyes, length 0.112 mm., width 0.080 mm., interval 0.076 mm.; prothorax, length along median dorsal line of pronotum 0.170 mm., width (inclusive of coxæ) 0.395 mm.; pterothorax, width 0.405 mm.; abdomen, greatest width 0.465 mm.; tube, length 0.210 mm., width at base 0.076 mm., at apex 0.044 mm.

Male (macropterous).—Slightly smaller than female (length 1.9 mm.), and essentially like it in structure; but with the posterior pair of cheek bristles longer and stouter; the pronotum with a thickened median line and the bristles at its anterior angles pointed and fully as long as its median length; the fore femora somewhat swollen and nearly one-half as wide as head; the tarsal tooth as long as width of tarsus; and the abdomen more slender.

Described from one female (holotype) taken by Mr. P. J. Chapman (Assistant Extension Entomologist at Cornell University), under bark on either poplar or cottonwood, Cinnamon Lake (near Beaverdams), N. Y., June 5, 1925; from one female (paratype) taken by Mr. Chapman on a dead limb (possibly maple), Ithaca, N. Y., August 6, 1926; and from one male taken by Mr. J. C. Faure (now Professor of Entomology, Transvaal University College), on tobacco foliage, Elmira, N. Y., July 2, 1912. The holotype was only one of many specimens seen by Mr. Chapman, and the species is of course a bark-inhabiting one, Mr. Faure's specimen being merely adventitious on tobacco.

This is an unusually colored and striking species, the two snow-white stripes along the sides of the abdomen contrasting sharply with the bright maroon background. Its congener vittatus and the related Acanthothrips albivittatus are very similar to it in the general plan of coloration. Chapmani, however, has the white stripes confined to the sides of the abdomen; in vittatus they extend along the sides of the prothorax and abdomen; while in Acanthothrips albivittatus they occupy the sides of the head, prothorax, pterothorax, and abdomen, with a brief interruption only on the first abdominal segment. It is particularly interesting to note that the antennal coloration of all three is almost identical, and that the types of all have come from species of the genus Populus!

Phlæothrips vittatus Hood.

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1912. Phlæothrips vittatus Hood, Proc. Biol. Soc. Wash., XXV, 11. [2 &, Baldwin, Mich., under bark on poplar stump.]

This strikingly-colored species has previously been known from the two male types, taken by the writer at Baldwin, Michigan, August 17, 1908, under rotting poplar bark. Mr. P. J. Chapman found one female at Parkers, Lewis Co., N. Y., September 2, 1926. These three are the only specimens known.

Aside from the usual differences due to sex, such as the slightly larger size and stouter abdomen, the female is in all respects very much like the males. The conspicuous snow-white longitudinal band on either side of the pronotum and abdomen terminates on the eighth abdominal segment as a short basal dash, while in the two males this band appears more commonly to end on the seventh segment, one of the specimens having it prolonged onto the eighth on one side only. The reticulation of the dorsal surface shows more plainly in this specimen because it has been cleared in KOH, and exhibits a district tendency to become asperate, particularly on the pronotum and in a patch at each side of abdominal tergites 2-7. The postocular bristles are actually present in both sexes, but are reduced in size, being about twice as long as diameter of ocelli and only a little more widely separated than the eyes. The head is somewhat excavated in front, so that the median occllus is situated on an almost vertical wall and directed forward. The fore tarsus bears a small pointed tooth. The tube is about 0.85 as long as the head.

Genus Hoplandrothrips Hood

Following Bagnall and disagreeing with Priesner, I have assigned generic rank to this group of species, but with what justice I am not sure. Specific separation, too, is difficult, indeed, and for some years I have busied myself in studying the species alive in the laboratory, and in rearing them; but the results accomplished lie more in the number of slides available for study than in any definiteness of concept regarding specific limitation. Certain it is, however, that the various groups of individuals before me are worthy of names, but whether binomial or trinomial I am not sure. Perhaps they represent "formas," as the term is used by Priesner; but in a time of uncertainty like this, a binomial seems preferable because of its brevity.

Hoplandrothrips proximus sp. nov. (Pl. XXI, figs. 3 and 7.)

Female (macropterous).—Length about 2 mm. Color dark blackish brown, with maroon subhypodermal pigmentation disposed in large patches, not forming a nearly continuous layer; antennæ with segment 3 and pedicels of 4 and 5 yellowish, 3 more or less infuscate apically; wings nearly or quite colorless.

Head about 1.25 times as long as wide, broadest at middle; cheeks rounded abruptly to eyes and gently to near base. thence slightly diverging, forming a neck-like constriction which is equal in width to greatest distance across eyes, or to about 0.9 the greatest width of head; lateral and dorsal surfaces distinctly roughened with anastomosing lines, so that the cheeks have a distinctly serrated profile; cheeks each with about three small bristles arising from minute tubercles; vertex subconical, decidedly produced, overhanging; postocular bristles alone prominent, about 0.6 as long as eyes, dilated apically. Eyes one-third as long as head, slightly narrower than their interval. Ocelli of moderate size, distance between posterior ocelli slightly less than that between them and anterior ocellus; posterior margin of posterior ocelli on line with center of eyes. Antennæ 1.8 times as long as head, quite slender; segment 3 clavate, 2.3 times as long as wide, deeply sinuate on inner surface, pedicel curved outward; 4 slightly more than twice as long as wide; 8 subconical, truncate and slightly narrowed at base; sense cones: 3, 1-2; 4, 2-2; 5, 1-1+1; 6, 1-1+1; 7 with the usual one on dorsum near apex. Mouth cone about attaining mesosternum, labium broadly rounded and slightly surpassed by the acute labrum.

Prothorax about 2.5 times as broad across coxæ as median length of pronotum, which is about 0.55 that of head; pronotum nearly smooth; all usual bristles present, rather short, expanded apically, brownish, the two pairs at posterior angles slightly the longest, exceeding postoculars; others shorter, particularly the anterior marginals. Pterothorax slightly wider than prothorax across coxæ, sides nearly straight, converging posteriorly; metanotum longitudinally striate, except at center of extreme base, this striation being due to the great elongation of the separate reticles. Wings of fore pair colorless, distinctly broader in basal than in apical half, slightly narrowed at middle, moderately closely fringed (posterior margin with about 70 hairs), and with about eleven accessory hairs. Legs rather long, fore femora moderately enlarged, fore tarsus with a large, stout tooth.

Abdomen slightly broader than pterothorax, tube twothirds as long as head, usually about 2.4 times as long as basal width, and about twice as wide at base as at apex, sides straight. Lateral bristles of moderate length, knobbed, yellowish: terminal bristles distinctly shorter than tube, brown.

Measurements of holotype (♀): Length 1.98 mm.; head, length 0.30 mm., greatest width (at middle) 0.24 mm., least width (near base) 0.21 mm.; eyes, length 0.10 mm., width 0.068 mm., interval 0.076 mm.; postocular bristles, length (somewhat foreshortened) 0.056 mm.; prothorax, median length of pronotum 0.16 mm., width across coxe 0.41 mm.; pterothorax, greatest width 0.46 mm.; abdomen, greatest width 0.47 mm.; tube, length 0.20 mm., width at base 0.082 mm., at apex 0.043 mm.

Male (macropterous).—Much like female in color and general structure, but smaller and slenderer (particularly the abdomen), with the postocular and anterior angular bristles elongated (as is usual in the male), and with the usual armature of the fore femora and tibiæ.

Described from 13 females and 4 males, as follows:

NEW YORK: Macedon, May 18-31, 1924, under dead Salix bark, J. D. Hood; 7 \(\varphi \) (holotype and paratypes), 1 \(\varphi \) (allotype).

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Ithaca, May 27, 1926, under dead Salix bark, J. D. Hood; 1 & (paratype).

MARYLAND: Plummer's Island, April 17, 1913, under dead bark on Carpinus caroliniana,

J. D. Hood; 13 (paratype).

Illinois: Monticello, August 1, 1908, from grape vine on elm, C. A. Hart; 19 (para-

type).

Riverside, July 14, 1909, under dead bark on Salix stump, J. D. Hood; 5, 1, 1, (paratypes).

Though evidently very closely related to *juniperinus*, the specimens here described would seem to represent a distinct species, separable by the characters which have been italicized in the above description.

Hoplandrothrips gynandrus sp. nov. (Pl. XX, fig. 5; pl. XXI, fig. 2.)

Female (macropterous).—Length about 2.6 mm. Color dark blackish brown (almost black), sometimes with tarsi and extremities of tube slightly paler; subhypodermal pigmentation red (purplish when seen through the brown integument), not particularly dense nor extending into legs; antennæ dark blackish brown, with base of segment 1 and apex of 2 paler; 3 yellow, clouded with brown in distal two-fifths or less; 4 (and sometimes 5) irregularly paler basally and mottled, though largely dark blackish brown, as are 7 and 8; wings clear, or fore pair very faintly brownish in basal half.

Head long, about 1.4 times as long as greatest width, broadest at middle, cheeks subparallel, rounded to eyes and more gently to near base, thence slightly diverging, forming a neck-like constriction which is slightly narrower than the greatest width across eyes or about 0.9 the greatest width of head, set with about three small, dark, pointed bristles; entire dorsal and lateral surfaces reticulate, faintly in occipital region, more strongly at sides, so that the genæ are minutely serrate in profile; vertex slightly produced and overhanging, distinctly reticulate; postocular bristles less than half as long as eyes, dilated apically, situated near sides of head, their interval more than twice that of eyes. Eyes about one-third as long as head, less than 0.9 as wide as their interval. Occili almost exactly equidistant, those of posterior pair with their posterior margins opposite center of eyes. Antennæ long,

about 1.8 times the length of head, slender; segment 3 clavate, more than 2.5 times as long as greatest width, distinctly sinuate on inner surface, pedicel curved outward at base; 4 and 5 elongate, decidedly more than twice as long as wide; 8 only slightly narrowed at base, hence rather closely united with 7; sense cones: 3, 1-2; 4, 2-2; 5, 1-1⁺¹; 6, 1-1⁺¹; 7 with the usual one on dorsum near apex. Mouth cone nearly attaining posterior margin of prosternum, labium broadly rounded and slightly surpassed by the acute labrum.

Prothorax about 2.4 times as broad across coxe as median length of pronotum, which is hardly 0.6 that of head; pronotum nearly smooth, without evident reticulation; all usual bristles present, short, expanded apically, brown, anterior marginals a little slenderer and shorter than postoculars, the others about comparable with postoculars, excepting the coxal, which is shorter. Pterothorax slightly wider than prothorax, broadest across front margin, narrowest at posterior margin, sides nearly straight; metanotum reticulate, in basal half with the polygonal reticles nearly equilateral. Wings slenderer in distal half, with about 13 accessory hairs; subbasal bristles pale, equal in length to postoculars, distal one pointed. Legs of fore pair rather stronger than usual, the fore femora broad and with two large teeth on inner surface near apex, the fore tibix narrowed at base and sometimes with a distinct tooth beyond: fore tarsi with a stout, usually curved, tooth.

Abdomen very little broader than pterothorax. Tube somewhat more than 0.6 as long as head, about 2.4 times as long as greatest subbasal width (which is about twice the apical), sides nearly straight. Lateral abdominal bristles pale, rather shorter than usual, mostly knobbed; terminal

bristles brown, nearly as long as tube.

Measurements of holotype (\$\varphi\$): Length 2.55 mm.; head, length 0.37 mm., greatest width (at middle) 0.26 mm., least width (near base) 0.23 mm.; eyes, length 0.120 mm., width 0.076 mm., interval 0.088 mm.; postocular bristles, length 0.048 mm.; prothorax, median length of pronotum 0.20 mm., width across coxe 0.48 mm.; pterothorax, width 0.55 mm.; abdomen, width 0.58 mm.; tube, length 0.23 mm., width at base 0.094 mm., at apex 0.048 mm.

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Described from 4 females.

NEW YORK: Macedon, May 18 and 29, 1924, under dead bark of Salix sp. infested with Crypto-rhynchus lapathi, J. D. Hood; 4 \, \(\text{(holotype and paratypes)}\).

This large species is remarkable in that the fore legs of the female are armed in the same fashion as those of the males of most, if not all, of its congeners. At first glance it might seem better, because of the toothed femur, to place the species in Acanthothrips, to which genus it naturally runs in most keys; but the armature is really that of a male Hoplandrothrips, consisting as it does of two femoral teeth and a single tibial one. The antenne are distinctly not those of an Acanthothrips, but of a Hoplandrothrips, and, save for the unusual structures described, the species is very like juniperinus. That species is much smaller, however, has a shorter head, stouter antenne, and a differently sculptured metanotum. The discovery of the species contributes still more to the increasing uncertainty which surrounds the recognition of those genera related to Phlæothrips.

Pæcilothrips ornatus (Hood).

1913. Phlæothrips ornatus Hood, Proc. Biol. Soc. Wash., XXVI, 165. [Many ♀, Washington, D. C., on dving red oak tree.]

I have for some years suspected that my Phlwothrips ornatus might be congeneric, perhaps even con-specific, with Uzel's Pwcilo-thrips albopictus, described and still known from only the unique type taken in Bohemia. Dr. Priesner (in litt.) has suggested the same thing, but he has not yet been able to make a direct comparison. Though differing in several minor points from the description of albopictus, ornatus is almost certainly a Pwcilothrips, and is quite possibly a distinct species. That it is commoner in America than is albopictus in Europe would appear to be shown by the enumeration given below of material before me. The species has not heretofore been recorded from New York.

Dist. of Columbia: Washington, May 22, 24, 27, and June 5, 7, 12, 16, 18, 21, and 24, on trunk of red oak tree, H. E. Burke, J. R. Malloch, J. D. Hood; 37 \, \text{9}, 5 nymphs.

Pennsylvania: Harrisburg, August, 1915, pupa under dead

bark on hickory tree August 10 became adult August 13, W. S. Fisher; 1 2.

New York: Macedon, April 13, 1924, under bark on

hickory stump, J. D. Hood; 2 nymphs. Rochester, July 9, 1924, flying, J. D. Hood;

Cochester, July 9, 1924, flying, J. D. Hood; $1 \circ .$

Sodus Pt., Sept. 1, 1924, flying, J. D. Hood; $1 \circ$.

Megalothrips spinosus Hood.

1908. Megalothrips. (?) spinosus Hood, Can. Ent., XL, 306, figs. 16 and 17. [3 9 9 (holotype and paratypes), Harrisburg, Pa., in burrows in dead willow stem.]

1909. Megalothrips (?) spinosus Franklin, Ent. News, XX, 321. [2 \, \varphi\, 2\, nymphs, St. Paul, Minn., under dead bark on white birch.]

1910. Idolothrips spinosus Crawford, Pomona Coll. Journ. Ent., II, 170. [Merely refers the species to Idolothrips.]

1914. Megalothrips spinosus Hood, Proc. Biol. Soc. Wash., XXVII, 170. [Both sexes, Pa., N. Y., Md., Va., Ill., Minn.; refers the species positively to Megalothrips.]

1921. Idolothrips fuscus Watson, Bull. Brooklyn Ent. Soc., XVI, 84. [5 \, \text{N}, \text{N}, \text{Y}. and Mass., in Cerambycid burrows in basswood.]

1923. Gigantothrips fuscus Watson, Bull. 168, Fla. Agr. Exp. Sta., 71. [Merely refers the species doubtfully to Gigantothrips.]

With the exception of Elaphrothrips tuberculatus (Hood), which is recorded from New York for the first time in this paper, this is the largest species of thrips known to occur in northeastern America. It may be found in one stage or another the whole year through, in hollow twigs, under loose bark, in stem galls on goldenrod, and in various other situations of the sort. The adult is readily known by its large size (females average nearly 4 mm. in length), the nearly uniform piceous black color, the elongate head with its elevated, arched occiput, and the spinose tube; while the large nymph, with its deep red body contrasting sharply with the nearly

⁹ Though given as two in the original description, the number of types is actually three.

black head, prothorax, appendages, and last two abdominal segments is recognizable even to the naked eye by the paler meso- and meta-thorax, which are pink rather than red and give the insect a faintly banded appearance.

The better part of a year appears to be spent in the adult condition. A female which has spent the winter in a hollow twig or golden-rod gall, moving about within her confines on a warm day and relapsing into total inactivity on cold ones, proceeds in early spring to lay her eggs at intervals of every few days. Before the last eggs are laid, the first ones have hatched and the eldest in her growing family may even be well on their way toward maturity. When the adult finally dies I do not know; but they have been found in every month of the year, surrounded by offspring of assorted sizes, and unhatched eggs, indicating a family life of some duration. Nymphs of the first stadium have been taken as early as May 4 and as late as November 1, and the species appears to hibernate quite as readily in one instar as another.

At Macedon, New York, I once found a colony of fifteen adult females clustered about a patch of empty egg shells under the bark on a maple sapling which was serving as a fence rail. They had evidently developed from the eggs about which they were gathered and, as the time was in April, before the coming of spring, had apparently spent the winter as adults.

Another time, at Great Falls, Maryland, a female was found close beside a single egg which it had apparently just deposited, fully exposed, on the upper surface of an herbaceous plant (*Lactuca*) growing in an open woods—a most unusual situation, it would seem, for oviposition. Though disturbed by the handling of the leaf she was apparently loath to leave the vicinity and wandered about the egg in the deliberate manner of the species until, touched by the camel's-hair brush I was carrying, she spread her wings preparatory to flight.

This is a close relative of the European *M. bonannii* Uzel, the type of the genus, from which it may be known at a glance, however, by the uniform black antennæ. It is surprising that Mr. Watson should have failed to recognize this common species. The following material is now before me:

Pennsylvania: Harrisburg, March 10, in burrows in dead willow, Pa. State Dept. Agr., Div. Zool., No. 5251 h; 3 \, (holotype and paratypes).

Rockville, Nov. 10, 1912, in Cerambycid burrow in oak, A. B. Champlain; 15 \, \(\varphi \), 2 \, \(\varphi \).

NEW YORK:

- Syracuse, Oct. 6, 1920, in Cerambycid burrows in basswood, C. J. Drake; 2 \(\text{\$\gamma}\) (holotype [coll. Watson] and paratype [coll. Hood] of Idolothrips fuscus Watson).
- Ithaca, March 24, 1905, from hole in dead twig, Philena B. Fletcher; 1 ♀.
- Macedon, March 22, 1924, in stem gall on golden-rod, J. D. Hood; 1 ♀. April 20, 1924, under dead maple bark, J. D. Hood; 7 ♀. May 4 and June 7, 1924, under dead bark of willow infested with Cryptorhynchus lapathi, J. D. Hood; 4 ♀. 4 nymphs.
- Rock City, Sept. 16, 1925, under dead maple bark, P. J. Chapman; 1 \(\gamma\).
- Sea Cliff, L. I., Sept. 6, 1925, dead oak branches, P. J. Chapman; 5 ♀.

Massachusetts:

- Forest Hills, August 25, 1915, in galls on willow, L. T. Williams; 7 \, \text{1} \, \text{3}, \, 1 \, \text{nymph.}
- South Framingham, August 8, 1913, under bark of Fagus sylvatica, R. R. Parker; 1 nymph.

MARYLAND:

- Great Falls, May 23, 1915, on leaf of Lactuca, J. D. Hood; $1 \circ$.
- Plummer's Island, May 24, 1914, on willow, W. L. McAtee, 2 \(\gamma\); June 8, 1913, on willow, W. L. McAtee, Alexander Wetmore, J. D. Hood, 2 nymphs; Oct. 12, 1913, on willow, W. L. McAtee and J. D. Hood, 2 \(\gamma\), 3 \(\delta\).
- Plum Point, Aug. 10, 1913, sweeping, W. L. McAtee; 1 \circ .

VIRGINIA:

- Bluemont, Aug. 31, 1913, on spice bush, W. L. McAtee; $1 \ \circ$.
- Falls Church, Feb. 21, 1915, in dry chestnut leaf, W. L. McAtee, 1 9; June 28, 1918, sweeping, E. A. Chapin; 1 9.

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Rosslyn, Nov. 1, 1914, on dead willow, C. B. Williams and J. D. Hood; 1 ♀, 1 ♂, 3 nymphs.

Vienna, Apr. 7 and 19, 1913, in stem gall on golden-rod, R. A. Cushman; $2 \circ$.

Illinois: Carbondale, July 30, 1909, on persimmon twigs. L. M. Smith: 1 2.

Muncie, July 24, 1909, in burrow in willow

twig, J. D. Hood; 1 ♀.

MINNESOTA: St. Paul, Sept. 19, 1908, under dead bark on white birch, H. J. Franklin: 1 2.

Texas: Dallas, May 12, 1906, from Callirhoe involucrata, W. D. Pierce: 1 \(\varphi \).

Connecticut: Ellington, Aug. 15, 1924, M. P. Zappe; $1 \circ 2$.

New Jersey: Norwood, April 6, 1916, under beech bark, E. R. Kalmbach; many \circ .

Georgia: Bainbridge, June 1, 1911, J. C. Bradley;

Quebec, Canada: E. Hereford, Aug. 31, 1923, in Cecidomyid gall on Salix, T. C. Barnes; 1 \circ .

Genus Elaphrothrips Buffa (*Idolothrips* auctores, partim)

1909. Elaphrothrips Buffa, Redia, V, 162. [Type not designated; six species: Idolothrips quadrituberculatus Bagnall, I. assimilis Bagnall, I. coniferarum Pergande, I. flavipes Hood, I. longiceps Bagnall, and E. uniformis nov. sp.]

1909. Dicaiothrips Buffa, Redia, V, 169. [Type not designated; two species: Thrips Schottii Heeger and D.

bottegii nov. sp.]

The only character which has been pointed out for the separation of Elaphrothrips from Dicaiothrips is the presence, in the males of the latter genus, of a curved bristle at the apex of the fore femur. Such a bristle is of quite general occurrence, however, throughout the family. It is found in both sexes in many genera—though, to be sure, it is usually straight or nearly so. In Dicaiothrips, then, we have a genus whose sole diagnostic character lies in the form of a certain bristle which must be studied in the male sex only! Notwithstanding this, the separation might still be tenable were the

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character constant; but in a series of several species before me (and I believe it will be found true of all of the species of this so-called genus when large series become available for study) it is noted that the smaller and more slender-legged males have a weak, straight bristle in place of the large curved one which is so conspicuous in those with enlarged femora. In other words, the size and degree of curvature of the bristle varies directly as the size of the fore legs, which in turn is usually directly related to the size of the individual. Perhaps the difference is merely indicative of the amount of food available to the growing nymph.

I have accordingly had no hesitation in placing *Dicaiothrips* Buffa as a synonym of *Elaphrothrips* Buffa, which has a few pages priority. The United States species of the genus are as follows:

- 1. Elaphrothrips coniferarum (Pergande), Ent. News, VII, 63; 1896 (Idolothrips).
- 2. Elaphrothrips flavipes (Hood), Bull. Ill. State Lab. Nat. Hist., VIII, 377, fig.; 1908 (Idolothrips).
- 3. Elaphrothrips armatus (Hood), Ann. Ent. Soc. Amer., I, 285, figs.; 1908 (Idolothrips).
- 4. Elaphrothrips tuberculatus (Hood), Ann. Ent. Soc. Amer., I, 287, figs.; 1908 (Idolothrips).
- 5. Elaphrothrips parallelus Hood, Ent. News, XXXV, 315; 1924.

Of these, the first two (coniferarum and flavipes) have the femoral bristle always straight; armatus, at least in the series before me, has this bristle always curved; while tuberculatus varies in the same colony of individuals from one extreme to the other. The male of parallelus is not known.

Elaphrothrips tuberculatus (Hood)

1908. Idolothrips tuberculatus Hood, Ann. Ent. Soc. Amer., I, 287, fig. 9 (3b), fig. 10. [4 \, \varphi\, , 1 \, \varphi\, , White Heath and Bosky Dell, Ill., on white oak.]

1917. Idolothrips tuberculatus Hood, Ins. Insc. Menstr., V, 63. [Additional distribution: Mo., Md., D. C., Va.]

1922. Idolothrips tuberculatus Watson, Fla. Ent., VI, 21. [1 &, Gainesville, Fla., on Tilia.]

This, the largest species of thrips known from eastern North America, was taken in numbers last autumn by Prof. C. R. Crosby and Mr. P. J. Chapman, in North Carolina and New York, respec-

tively. It is a noteworthy addition to the New York fauna. The species is usually found among dead, curled oak leaves attached to broken branches, and is sometimes exceedingly abundant in such situations. The material now before me is as follows:

ILLINOIS: White Heath, Aug. 26, 1908, leaves of Quercus alba, C. A. Hart; 2 9 (holotype and paratype), 1 3 (allotype).

Bosky Dell, Oct. 22, 1908, Quercus alba, L. M. Smith; 1 \nabla (paratype).

Wittenberg, July 12, 1909, on walnut, C. A. Hart; 1 \, 2.

Stuttgart, Dec. 18, 1917, under hickory bark, Alexander Wetmore; 1 2.

Big Bald, Pisgah Range, Oct. 13, 1926, in dead oak leaves, C. R. Crosby; 4 9, 4 3.

Mt. Pisgah, Oct. 14, 1926, in dead leaves, C. R. Crosby; 2 ♀.

Nantahala Gap, Macon Co., Oct. 16, 1926, in dead leaves, C. R. Crosby; 7 9, 9 3.

Wayah Bald, Macon Co., Oct. 16, 1926, in dead leaves, C. R. Crosby; 1 2, 4 3.

Falls Church, May 25, 1913, on oak leaf, A. N. Caudell; 1 &.

Black Pond, June 21, 1914, on dead stump, W. D. Appel; 2 \, \text{1 }\ddots.

Glencarlyn, July 18, 1915, W. L. Me-Atee; 1 2, 1 3.

Mt. Vernon, June 2 and 21, 1915, among dead oak leaves, W. L. Mc-Atee, 4 \, \text{2}, 2 \, \text{3}, 6 nymphs; Aug. 1, 1915, among dead oak leaves, L. O. Jackson; 2 \, \text{2}, 1 \, \text{3}.

Scott's Run, Fairfax Co., May 20, 1914, flying, R. C. Shannon; 1 &.

Beltsville, May 17 and June 14, 1914; May 2, June 9, and Sept. 12, 1915, in dead oak leaves, J. D. Hood, W. 240

Missouri:

Arkansas:

NORTH CAROLINA:

Virginia :

Maryland:

Odenton, July 12, 1914, on chestnut, J. D. Hood: 1 2.

Plummer's Island, June 29, 1913, on oak, J. D. Hood; 1 &.

Dist. of Columbia: Washington, 1900, A. N. Caudell, 1 \, \varphi ;
April 23, 1913, flying, W. L. Me-

Atee; $1 \circ$.

New York: Long Pond, Suffolk Co., Sept. 19, 1926, in dry oak leaves on broken limb, P.

J. Chapman; 9 ♀, 5 ♂.

Wading River, Long Island, Sept. 19, 1926 [no further data], P. J. Chapman and A. M. Boyce; 2 ♀.

The variation in the male sex is worthy of note. Some individuals are fully twice as large as others, and these have the fore femora tremendously enlarged. Such males are always provided with a large, hook-shaped bristle on the fore femur, arising on the dorsal surface near the apex and curving outward and downward. The smaller males have slender fore femora, and the bristle at the apex is small and straight, though directed outward. These characters have heretofore been considered of generic rank.

PLATE XX

(Clara Husted et J. D. H., del.)

- Fig. 1.—Thrips monotropæ Hood, ♀, holotype, head and prothorax. (All leg bristles omitted.)
- Fig. 2.—Thrips veratri Hood, \circ , paratype, head and prothorax. (All leg bristles omitted.)
- Fig. 3.—*Echinothrips subflavus* Hood, ♀, holotype, head and prothorax. (All leg and antennal bristles omitted.) Note that there is only one bristle on the left side of the prothorax at the posterior angle.
- Fig. 4.—Sericothrips annulipes Hood, ♀, holotype, pronotum.
- Fig. 5.—Hoplandrothrips gynandrus Hood, ♀, holotype, head and prothorax. (All leg and antennal bristles omitted.)

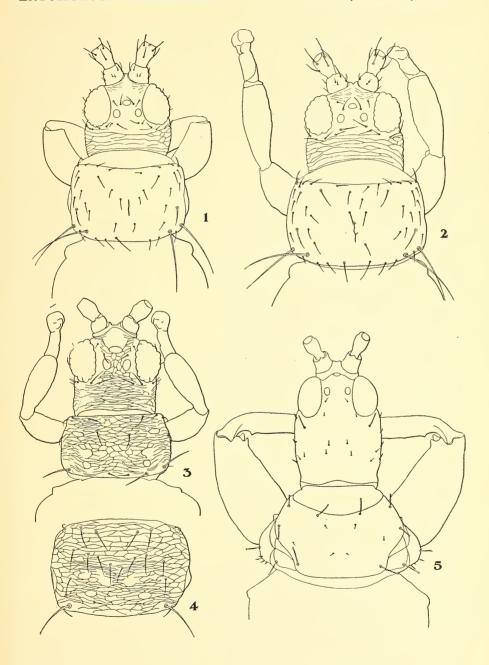


PLATE XXI

(Clara Husted, Inez d'Amanda, et J. D. H., del.)

- Fig. 1.—Thrips monotropæ Hood, ♀, holotype, left antenna. (All bristles and sense cones omitted.)
- Fig. 2.—Hoplandrothrips gynandrus Hood, \circ , holotype, third segment of right antenna. (All ventral bristles and the ventral trichome on outer surface omitted.)
- Fig. 3.—Hoplandrothrips proximus Hood, ♀, paratype, third segment of right antenna. (All ventral bristles and the ventral trichome on outer surface omitted.)
- Fig. 4.—Phlæothrips chapmani Hood, ♀, holotype, left antenna.
- Fig. 5.—Phlæothrips chapmani Hood, ♀, paratype, head and prothorax. (Nearly all minor bristles omitted.)
- Fig. 6.—Cryptothrips (?) breviventris Hood, ♀, holotype. (All leg and antennal bristles omitted.)
- Fig. 7.—Hoplandrothrips proximus Hood, ♀, holotype, head and prothorax. (All minor bristles omitted.)